

WHAT IS CLAIMED IS:

1. A position detecting method comprising steps of:
sensing an image of first and second marks;
5 orthogonal transforming a signal obtained in said
sensing step; and
calculating each position of the first and second
marks based on a phase of a corresponding frequency
component obtained in said transform step.
- 10 2. A method according to claim 1, wherein the first
and second marks are provided on first and second
objects, respectively.
3. A method according to claim 1, wherein the first
and second marks are provided on a same object.
- 15 4. A method according to claim 1, wherein patterns
are disposed at a first interval in the first mark,
patterns are disposed at a second interval in the
second mark, and one of the first and second intervals
is not an integer multiple of the other of the first
20 and second intervals.
5. A method according to claim 3, wherein said
calculation step includes calculating a coarse
position of the object based on the phase
corresponding to one of the first and second marks,
25 and calculating a fine position of the object based on
the coarse position and the phase corresponding to the
other of the first and second marks.

6. A method according to claim 1, wherein the first mark includes two groups of patterns, in each of the two groups patterns are disposed at an interval A, the two groups are disposed at an interval nA , where n is an integer, and the second mark falls within the interval nA in the signal.
7. A method according to claim 1, wherein both of the first and second marks are disposed corresponding to each of two directions perpendicular to each other.
- 10 8. A position detecting apparatus comprising:
a sensing unit which senses an image of first and second marks;
a transform unit which orthogonal transforms a signal obtained by said sensing unit; and
15 a calculation unit which calculates each position of the first and second marks based on a phase of a corresponding frequency component obtained by said transform unit.
9. An apparatus according to claim 8, wherein the first and second marks are provided on first and second objects, respectively.
10. An apparatus according to claim 8, wherein the first and second marks are provided on a same object.
11. An apparatus according to claim 8, wherein
25 patterns are disposed at a first interval in the first mark, patterns are disposed at a second interval in the second mark, and one of the first and second

intervals is not an integer multiple of the other of the first and second intervals.

12. An apparatus according to claim 10, wherein said calculation unit calculates a coarse position of the object based on the phase corresponding to one of the first and second marks, and calculates a fine position of the object based on the coarse position and the phase corresponding to the other of the first and second marks.

13. An apparatus according to claim 8, wherein the first mark includes two groups of patterns, in each of the two groups patterns are disposed at an interval A, the two groups are disposed at an interval nA , where n is an integer, and the second mark falls within the interval nA in the signal.

14. An apparatus according to claim 8, wherein both of the first and second marks are disposed corresponding to each of two directions perpendicular to each other.

15. An exposure apparatus for exposing a substrate to a pattern, said apparatus comprising a position detecting apparatus defined in claim 8.

16. A device manufacturing method comprising a step of exposing a substrate to a pattern using an exposure apparatus defined in claim 15.